

**REMARKS**

The Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1-3 and 5-6 are currently pending to be examined on their merits.

The Applicants submit herewith a certified copy of a priority document to perfect the priority claim.

**35 U.S.C. § 103 Claim Rejection**

Claims 1-3 and 5-6 are rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Wu (*Catalysts & Catalysis*, 2003, 45(2) 107-110) in view of Abekawa (US 2005/0182264). The Applicants respectfully traverse the rejection.

*(i) Current Obviousness Standard*

The U.S. Supreme Court recently reaffirmed the Graham factors for determining obviousness in *KSR Int'l Co. v. Teleflex Inc.* (No. 04-1350) (U.S., April 30, 2007). The Graham factors, as outlined by the Supreme Court in *Graham et al. v. John Deere Co. of Kansas City et al.*, 383 U.S. 1 (1966), are: 1) determining the scope and contents of the prior art; 2) ascertaining the differences between the claimed invention and the prior art; 3) resolving the level of ordinary skill in the pertinent art; and 4) evaluating evidence of secondary consideration. The Supreme Court recognized that a showing of "teaching, suggestion, or motivation" to combine the prior art to meet the claimed subject matter could provide a helpful insight in determining whether the claimed subject matter is obvious under 35 U.S.C. § 103(a) and held that the proper inquiry for determining obviousness is whether the improvement is more than the predictable use of prior art elements according to their established functions. The Court noted that it is "important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed and specifically stated:

Often, it will be necessary . . . to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace;

and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was *an apparent reason to combine the known elements in the fashion claimed* by the patent at issue. To facilitate review, this analysis should be made explicit.

*KSR Int'l Co. v. Teleflex Inc.*, slip op. at 14 (emphasis added). As discussed below, the teachings of the cited references do not render the present claimed invention obvious.

(ii) *Wu teaches away from the present invention*

Contrary to the Office's assertion on p. 2 of the Office Action, the teachings of Wu are distinct from the presently claimed methods and Wu teaches away from current invention.

The Office refers to p. 3, ¶ 2, of Wu regarding "excellent catalytic activity." See p. 2 of the Office Action. This portion of Wu refers to the benefit of post treatment, such as acid treatment or calcination, as having significant effects on catalytic activity. At the outset, Wu describes two titanosilicate catalysts. One is a "not-calcined catalyst" prepared by acid treatment without calcination. *See* Wu, Fig. 1(b) and the corresponding disclosure in Section 2 ("Experiment") on p. 4. This not-calcined catalyst is described as a bad catalyst by Wu and, after reading the article, one of skill in the art would not use this catalyst in a similar reaction. In fact, as described below, the use of this not-calcined catalyst is what Wu sets out to distinguish from his beneficial findings.

The other catalyst of Wu (and the essence of Wu) is a "calcined catalyst" prepared by calcination of the acid-treated titanosilicate at 823 °K. *See* Wu, Fig. 1(c) and the corresponding disclosure in Section 2 ("Experiment") on p. 4. In stark contrast to the present invention, Wu's teachings are directed to a calcined catalyst. *See e.g.*, the paragraph bridging p. 3 and p. 4 of Wu, "[a]n object...is to improve the activity of the Ti-MWW by post treatment [e.g., calcination], particularly to improve catalytic activity on epoxidation of..." Wu further teaches that a calcined catalyst is more suitable than not-calcined catalyst for epoxidation of linear alkenes such as 1-hexene. *See* Wu, p. 7, lines 1-7. As to the difference in catalytic activity, Wu teaches that linear alkenes have much lower activity in the non-calcinated context. See, for example, Table 1 of Wu, showing 1-hexane conversion improved significantly in the calcinated context. Wu suggests this affect is caused by steric

hindrance. Accordingly, based on Wu's teachings, one of ordinary skill in the art would not have applied a not-calcined catalyst to the epoxidation of propylene because propylene (i.e. C3 molecule) would show an even greater affect with calcined catalyst than 1-hexene molecule (i.e. C6 molecule).

The presently claimed methods involve catalysts prepared by acid treatment without calcination. *See* p. 7, lines 11-18 of the present Specification. The catalyst is used to produce propylene oxide in the presently claimed methods using a reaction of hydrogen peroxide with propylene in the presence of the catalyst. Thus, Wu teaches away from the presently claimed method of using a not-calcined catalyst. Specifically, because Wu teaches away from the present invention by disclosing that calcined catalyst is suitable for epoxidation of linear alkenes, one of ordinary skill in the art would not have arrived at the presently claimed methods using a not-calcined catalyst.

The Applicants reiterate the position already set forth in the July 10, 2009 Reply that one of ordinary skill in the art would not have had a reason to combine Abekawa's teachings with those of Wu. Specifically, Abekawa's general disclosure of a crystalline titanosilicate catalyst (*see* Abekawa, ¶[0009]-[0019]) does not remedy the deficiencies of Wu. Accordingly, one of ordinary skill in the art would not have had a reason to combine the teachings of Wu and Abekawa.

*(iii) Unexpected desirable results from the presently claimed methods*

In addition to teaching away from Wu, the presently claimed methods provide unexpected results over Wu. As described above, in stark contrast to Wu, the presently claimed methods unexpectedly produce propylene oxide from propylene effectively, even when the catalyst produced by acid treatment without calcination is used in epoxidation of propylene.

Examples 1 and 2 in the present Specification show the production of propylene oxide by the claimed method, while Comparative Examples 1 and 2 show the production conducted in the same manner as the Examples except that the catalysts were prepared by calcining the Ti-MWWs used for the Examples. In other words, Comparative Examples 1 and 2 are in line

with Wu. As demonstrated in the contrast between Examples 1 and 2 and Comparative Examples 1 and 2, respectively, not calcined catalysts show much higher propylene oxide production activities than the calcined catalysts. In effect, the present application surprisingly demonstrates desirable results opposite to Wu. Such unexpected results rebut any *prima facie* case of obviousness.

Therefore, at least in view of the foregoing, the Applicants respectfully request that the rejection be withdrawn.

**CONCLUSION**

The Applicants believe that the present application is now in condition for allowance and thus respectfully request favorable reconsideration of the application.

The Office is invited to contact the undersigned by telephone if a telephone interview would advance the prosecution of the present application.

The Office is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, the Applicants hereby petition for such extension under 37 C.F.R. § 1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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